Atmos. Chem. Phys. Discuss., 15, C6846–C6853, 2015
www.atmos-chem-phys-discuss.net/15/C6846/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Overview of the Chemistry-Aerosol Mediterranean Experiment/Aerosol Direct Radiative Forcing on the Mediterranean Climate (ChArMEx/ADRIMED) summer 2013 campaign" *by* M. Mallet et al.

Anonymous Referee #2

Received and published: 15 September 2015

Review of the submitted paper to ACP "Overview of the Chemistry-Aerosol Mediterranean Experiment/Aerosol Direct Radiative Forcing on the Mediterranean Climate (ChArMEx/ADRIMED) summer 2013 campaign" by Mallet et al. The authors present the overview of the ChArMEx/ADRIMED campaign, which investigates the properties and the radiative effects of aerosols Mediterranean region (mostly Western and Central parts of it). Unfortunately, during the campaign period no major aerosol events/plumes occurred in the region in terms of AOD. This manuscript mostly paves the way to the other papers of the way, so in its current status is light in term of scientific findings,

although there is presentation of a lot of material from different observations/models mostly as capability examples but not necessarily connected between them (as they refer to different events/periods in general) or answering specific scientific questions. Thus, at the end the reader is wondering why this paper should be published. Personally, as a reviewer I see two ways that could improve the paper in order to make it suitable for publication in ACP. Either strengthen the Introduction section by expanding significantly the discussion about the rationale of the campaign and the open scientifically questions that it tries to tackle together with a Conclusion section about the outcomes of the whole campaign (at least till now) and not just the main findings of this manuscript only. Or provide more scientific results in sections 5 and 6, which are connected together and not just sub-sections of the type 'the instrument/model observed/simulated this and more deep analysis can be found in that paper'. I encourage the authors to do the respective work in order to improve the quality of their paper and see it published.

Major comments

1.Page 19621, Line 17-18: "Numerous studies have documented the AOD for polluted-anthropogenic Mediterranean aerosols ..." Why in the introduction there is an overview of the literature only for AOD? What about other properties of aerosols like single scattering albedo (SSA), vertical distribution, etc., there is no information about them, but there are also important.

2.Page 19626, Line 1-9: Which are the open scientific questions addressed by the campaign? From the three main objectives, the first is general applicable to every campaign and the second has been addressed already in the literature, so which are the novelties except from the application to a new dataset (although may be more extensive)? The third objective seems more original; however there is no citing paper in the manuscript trying to explore the questions of this objective. Someone may say that it is rather early to tackle these questions, something that future papers will do. However, there is not indication about that in the current manuscript. In any way it is

not clear why this campaign was/had to be organized, except for the obvious reason of providing a new extensivie dataset.

3.Which of the results summarized in the Conclusions section is new or even important for the Mediterranean region? Just by comparing with the existing references used in the Introduction and the other sections of the manuscript it is not clear what this paper adds on the existing literature.

Minor comments

1.Page 19621, Line 22: AOD value of 0.1 you do not call it moderate but low, please rephrase.

2.Page 19621, Line 27-28: "... only few studies have been dedicated to biomass burning aerosols ...". I do not think it is the case, see e.g. Amiridis et al. (2012), Baldassarre et al. (2015), Barnaba et al. (2011), Kaskaoutis et al. (2011), Liu et al. (2009), Markowicz et al. (2002 – which is cited in the manuscript), Ravetta et al. (2007). Please rephrase and add references accordingly.

3.Page 19624, Lines 4-11: Additional papers dealing with the radiative effects of smoke aerosols are: Markowicz et al. (2002), di Sarra et al. (2008) (both of them cited in the manuscript) and Kaskaoutis et al. (2011). Please rephrase and add references accordingly.

4.Page 19626, Line 2: "... an innovative database ..." I agree that the database is rich, but what is the innovation about it?

5.Page 19627, Lines 18-20: "The Capre Corsica ... in-situ measurements". Please rephrase as the statements "remote site" and "important local anthropogenic sources" are contradictory.

6. Page 19633, Line 22: "... see also description in Dubovik et al., 2011". This paper is not relevant to currently available AERONET products, as it is about spectral multi-angle polarimetric satellite observations from POLDER/PARASOL.

7.Page 19634, Lines 11-25: What's the point of the EARLINET/ACTRIS network section as the 4 stations operated only for 1-2 days during the campaign and none of their data is presented in the manuscript. I suggest either to eliminate or to reduce significantly.

8.Page 19638, Line 24: Not all the balloons had ozone sondes, modify accordingly.

9.Page 19639, Line 26: Add references for the satellite retrievals.

10.Page 19640, Line 9: "... anthropogenic aerosols over the Mediterranean." Delete as in the subsequent discussion in this section there is nothing about anthropogenic aerosols. Otherwise add some text.

11.Page 19640, Line 23, Page 19641, Line 3 and Line 21: Provide AOD values for SEVIRI.

12.Page 19642, Line 6 and 25: Provide references for NCEP reanalysis and CRU data.

13.Page 19643, Lines 19-21: State explicitly the period for which the anomalies have been calculated, i.e. 2000-2013?

14.Page 19643, Line 27: Why unexpected? Both Formenti et al. (2002) (cited in the manuscript) and Ravetta et al. (2007) presented similar cases.

15.Page 19645, Line 5: Why there are gaps for the observations of PM10 at Ersa in Fig. 13?

16.Page 19645, Lines 8-10: Give the values of PM10 at Lampedusa as done for Ersa and not PM40.

17.Page 19645, Line 11: Add "of PM40" after "significant peak".

18.Page 19646, Lines 11-15: Why the number of samples is not the same for the Ersa and Cap d'En Font stations in Fig. 14 and Tab. 6?

19.Page 19647, Lines 6-8: It is not evident why at Lampedusa there is important vari-

ability for the size of the coarse mode. The other sites have similar variability. Be more specific and may be add some text.

20. Page 19652, Lines 8-10: Why present data for these AERONET stations?

21.Page 19652, Lines 8-10: The following AERONET stations Ouijda, Cagliari, Cap d'En Font, Ouarzazate, Frioul and Majorque while appear in Figs. 18 and 25, there are missing from Tab. 2.

22.Page 19653, Line 8: Delete Tab.7 as the all the information exists in Fig. 19.

23.Page 19656, Lines 15-18: Certainly the wavelength dependence is lower than below the 2 km, but it is not very small, as someone can see just above and below the peak at about 3 km. Why this happens?

24.Page 19657, Lines 6-8: Is the LNG cross section in Fig. 23 correct? It seems from the text and the AOD figure below that the latitude axis is inverted.

25.Page 19661, Line 15: An AOD of 0.28 is not moderately high, especially for Lampedusa. Delete the word "high".

26.Page 19666, Line 24: Provide the information of the visible range wavelengths for each of the models in Figure 27.

27.Page 19669, Line 20: Delete "vegetation fires", as no fires occurred during the campaign according to the previous sections of the manuscript.

28.Page 19670, Lines 24-27: As it is written the phrase does not make sense to me, while I am looking at Fig. 29. Please provide more explicitly the type of surface (desert, sea, vegetation) after the word "TOA".

29.Homogenize the boundaries of the maps in Figs. 1, 5, 6, 7, 9, 10, 11, 12, 27 and 29. The same for Figs. 2, 3 and 4.

Technical comments

1.Page 19621, Line 20: Crete is a Greek island, please modify accordingly.

2.Page 19622, Line 19: The citation Kubilay et al. (2003) is missing from the References.

3.Page 19623, Lines 19 and 27, Page 19624, Line 1, Page 19625, Line 6, Page 19659, Line 7, Page 19660, Line 16: Delete "D" from the citation "D. Meloni et al., 2015" and write to which of the two papers you are referring.

4.Page 19623, Line 21: di Sarra et al. (2011) examine dust aerosols not polluted, so delete.

5.Page 19624, Line 15, Page 19661, Line 6: Nabat et al. (2015), which of the three?

6.Page 19628, Line 12: Insert "in" between "reported" and "Table 1".

7.Page 19629, Line 11, Page 19652, Line 6: The citation Formenti et al. (2015) is missing from the References.

8.Page 19636, Line 11: The citation Petzold et al. (2013) is missing from the References.

9.Page 19636, Lines 15-16: The citation Moonsmuller et al. (2012) is missing from the References.

10.Page 19636, Line 22: The citation Karol et al. (2013) is missing from the References.

11.Page 19638, Line 28: The citation Vialard et al. (2015) is missing from the References.

12.Page 19647, Line 26: Renard et al. (2015), which of the two?

13.Page 19651, Line 12: The citation Vaishya et al. (2012) is missing from the References.

14. Page 19653, Line 25: Change "Fig. 13" with "Fig. 14".

15.Page 19656, Line 24: Provide the wavelengths for the “Angstrom exponent”.

16.Delete the papers Sicard et al. (2006, 2011) and Ramanathan et al. (2009) from the References as they do not appear in the text.

17.In Tab. 1 (2nd column) change the wavelength of the Leosphere lidar from 350 to 355 nm.

18. In Tab. 2 the number of observations should be hours (or 15 mins periods), but not days.

19.In Tab. 5 for 16 Jun, 09:58 replace “LOA” by “LOAC” in the 2nd column.

20.Rotate Fig. 8.

References

Amiridis, V., Zerefos, C., Kazadzis, S., Gerasopoulos, E., Eleftheratos, K., Vrekoussis, M., Stohl, A., Mamouri, R.E., Kokkalis, P., Papayannis, A., Eleftheriadis, K., Diapouli, E., Keramitsoglou, I., Kontoes, C., Kotroni, V., Lagouvardos, K., Marinou, E., Giannakaki, E., Kostopoulou, E., Giannakopoulos, C., Richter, A., Burrows, J.P., Mihalopoulos, N.: Impact of the 2009 Attica wild fires on the air quality in urban Athens, Atmos. Environ. 46, 536–544, 2012.

Baldassarre, G., Pozzoli, L., Schmidt, C. C., Unal, A., Kindap, T., Menzel, W. P., Whitburn, S., Coheur, P.-F., Kavgaci, A., and Kaiser, J. W.: Using SEVIRI fire observations to drive smoke plumes in the CMAQ air quality model: a case study over Antalya in 2008, Atmos. Chem. Phys., 15, 8539-8558, doi:10.5194/acp-15-8539-2015, 2015.

Barnaba, F., Angelini, F., Curci, G., and Gobbi, G. P.: An important fingerprint of wildfires on the European aerosol load, Atmos. Chem. Phys., 11, 10487-10501, doi:10.5194/acp-11-10487-2011, 2011.

Kaskaoutis, D. G., Kharol, S. K., Sifakis, N., Nastos, P. T., Sharma, A. R., Badarinath, K. V. S., and Kambezidis, H. D.: Satellite monitoring of the biomass-burning aerosols

during the wildfires of August 2007 in Greece: Climate implications, Atmospheric Environment, 45, 716–726, doi:10.1016/j.atmosenv.2010.09.043, 2011.

Liu, Y., Kahn, R. A., Chaloulakou, A., and Koutrakis, P.: Analysis of the impact of the forest fires in August 2007 on air quality of Athens using multi-sensor aerosol remote sensing data, meteorology and surface observations, Atmospheric Environment, 43, 3310–3318, 2009.

Ravetta, F., Ancellet, G., Colette, A., and Schlager, H.: Long-range transport and tropospheric ozone variability in the western Mediterranean region during the Intercontinental Transport of Ozone and Precursors (ITOP-2004) campaign, Journal of Geophysical Research, 112, doi:10.1029/2006JD007724, 2007.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 19615, 2015.